ATOMIC ENERGY

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Dear Sir:

Two nuclear detonations occurred in the last fortnight, to make the 27th and 28th atomic bombs which the United States has exploded. One bomb was set off at an altitude of about 3,000 feet; the other at about 2,000 feet. The explosions marked the latest series of tests at the USAEC's Nevada proving ground, near Las Vegas. Both explosions were held in conjunction with troop maneuvers, to acquaint troops with the action of atomic bombs. As in previous tests, large numbers of observers were present, in an affort to familiarize those concerned with the action of the atomic bomb.

A new nuclear reactor of advanced design has been put into operation by the Oak Ridge National Laboratory. The new reactor, known as the low intensity test reactor (LITR), is being used to make high-priority tests of radiation effects on certain construction materials of possible use in future nuclear reactors. It will also produce limited quantities of rare radioisotopes such as chromium-51. Originally, the LITR served as a nuclear mock-up of the materials testing reactor (MTR) now in operation at the national reactor testing station, Arco, Idaho. At such, it "went critical" in the Spring of 1950; it was then improved to operate at higher power, and was later used to train MRT operators. Research facilities were added, and the power further increased in the Fall of 1951. The LITR was designed and constructed by Oak Ridge National Laboratory people; its total cost was approximately $1 million.

Construction is almost completed on the first non-USAEC nuclear reactor in the United States. This is the low power research reactor now being built on the North Carolina State College campus, entirely at the college's expense. Because of statutory requirements the USAEC must retain ownership of the fissionable material used in the reactor; however, that will be the extent of its responsibility, with the University free to use the reactor as it sees fit. It is believed the reactor will be in operation before the end of the year.

Wishful thinking cannot substitute for preparedness against atomic attack, Millard Caldwell, Federal Civil Defense Administrator warned in his first annual report, released in Washington in the last fortnight. Mr. Caldwell blamed the apathy of Federal, state and local officials for the relatively small progress made so far in civil defense. He said some of the leadership mistakenly believe the military will assume responsibility for civil defense if we are attacked. Others, he stated, blindly proceed on the assumption that the Air Force can prevent such an attack. Still others, he pointed out, feel the Soviet Union's fear of retaliation will deter a bombing of the United States. Some, he feels, take refuge behind the talk of new weapons, more planes and "scientific miracles". None of this wishful thinking can substitute for the trained, volunteer force of 17,500,000 individuals needed to provide the United States with emergency services in the event of an atomic bombing Caldwell stated. Of the total needed, but 1,870,000 have been recruited...Meanwhile, C.R. Huebner, Civil Defense Director, New York, said more persons will be killed by panic than by the bomb, were an explosion to occur over New York City.

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INDUSTRIAL ATOMIC ACTIVITIES...

NEW UNIT ESTABLISHED- To aid in the administration of the industrial participation program of the USAEC, and to expand the areas in which all types of industry may find an interest in the broad aspects of the nation's atomic energy program, the USAEC has now set up in Washington an Office of Industrial Development. It will be headed by Dr. William Lee Davidson, former director of physical research for the B. F. Goodrich Co., and will concern itself with atomic energy as related to the fields of chemistry, metallurgy, specialized equipment, and power generation.

NUCLEAR REACTORS FOR PRODUCTION OF POWER & FISSIONABLE MATERIAL- One of the four teams of industrial firms that have been working with the USAEC to develop atom-generated electric power has now decided to continue its activities in this undertaking. The team which made this decision is composed of the Dow Chemical Company and the Detroit Edison Company and they estimate the cost of extending their activities at about $250,000. Other groups, which participated in this preliminary work, are Monsanto Chemical Co., and Union Electric of St. Louis; Commonwealth Edison and Public Service of Northern Illinois, Chicago; and Pacific Gas and Electric and Bechtel Corporation of San Francisco. Whether these latter firms will decide, as have Dow and Detroit Edison, to continue their work, remains to be seen, as they have not yet submitted reports to the USAEC on their preliminary studies. The USAEC emphasized that its action in permitting Dow-Detroit Edison to continue work on the feasibility of nuclear reactors for production of power and fissionable material does not constitute a selection among the four teams involved. Rather, Dow-Detroit Edison were the first to conclude the preliminary studies and request further work. The next stage for Dow-Detroit Edison will include additional research and development work by both the companies and USAEC laboratories. The study will involve both reactors and chemical separation processes, but will not provide a final reactor design. All teams are studying general types of nuclear reactors, and the work may result in the first concrete evaluation of the economic feasibility of producing electrical energy by nuclear processes. In their interim reports, which all teams have submitted, they showed, the USAEC has said" a cautious optimism that the difficult technical and cost factors involved (in producing economically usable electrical energy by nuclear means) will be solved eventually".

NEW RADIOCHEMICAL LABORATORIES- Specially constructed laboratory facilities will house its new Radiochemicals Division, Dr. Johan Bjorksten, of Bjorksten Research Laboratories, Madison, Wisc., recently announced. He said the new division will specialize in tracer studies.

NEW PRODUCTS, PROCESSES & INSTRUMENTS...in the nuclear field...

FROM THE MANUFACTURERS- Scintillation converter unit, Model A-200, is designed to allow users to employ scintillation counters with an ordinary Geiger scaler. Model A-200 does this by providing the three features essential for reliable scintillation counting: namely, a high gain linear response amplifier, a true pulse height discriminator, and a regulated and stable high voltage power supply. The Model A-200 provides the H. V. for the counter; the pulses from the counter are fed into the unit for amplification and pulse discrimination and then into the scaler. The high gain amplifier has a rise time of 0.25 miscroseconds, and a variable gain up to 2000, providing sensitivity down to 0.75 millivolt pulses.--Nuclear Research & Development, Inc., 1094 Sutter Ave., St. Louis 5, Mo.

Small high efficiency gamma Geiger tube, model TGC-8, for fast, reliable measurement of gamma activity. Tube is constructed of heavy stainless steel tubing having a weight per unit area of more than 300 milligrams per sq. cm., and hence will not respond to beta radiation. The end-on gamma efficiency of this new tube is said to be about five or six times as great as that of this maker's previous Geiger tubes because of the tube's construction employing multiple baffles inside a heavy metal sleeve.--Tracerlab, Inc., Boston 10., Mass.

NOTES- The first commercial scale synthesis of radioactive glycerol has just been completed by the United States Testing Co., Inc., Dr. Gustavus J. Esselen, vice-president of that firm announced recently. The compound, Dr. Esselen said, is the result of four years of research and development work, and will be used in the study of fat metabolism, pituitary hormones, bile secretion, blood sugar, and other growth processes. Many industrial processes can also be explored with the radioactive material.

STATUS REPORT ON ATOMIC ENERGY: A special digest of remarks by T. Keith Glennan, USAEC Commissioner, at Southeastern Electric Exchange, Boca Raton, Fla., April 22, 1952.

What about the atom as a source of heat energy for the ultimate production of electrical energy?

Well, this nation has an interest in this matter because the reserves of more conventional fuels do have finite limits. While we are in no immediate danger from these limitations, time does have a habit of moving faster than one is willing to admit. Information from reliable authorities indicates that the energy, that might be derived from recoverable uranium that can be mined throughout the world at realistic costs, exceeds substantially that energy which resides in the world's reserves of coal and oil.

Furthermore, competent authorities are in agreement that atomic power is technically feasible.

The enthusiasms of these analysts begin to waver when they start to consider the economic factors that are involved for at the present state of the art a nuclear reactor, from which the heat to produce electrical energy will be derived, is an expensive device. To achieve competitive costs, therefore, ways must be found to decrease the capital outlay for the reactor.

Here are some of the accomplishments of our reactor development division:

We are now constructing, at the National Reactor Testing Station, Arco, Idaho, a land based prototype of a reactor suitable for submarine propulsion. We call this device the submarine thermal reactor. The design and development contractor is the Westinghouse Electric Corporation. This unit, when completed, will develop a significant amount of power. Despite the inherent difficulties involved in extreme limitations on space availability and environmental hazards for operating personnel, we have pursued this approach to the power problem because nuclear fuel offers real technical advantages in the realm of submarine propulsion. Much of the technology gained in this program will apply directly to the development later on of central station power plants. If a nuclear reactor can be crammed into the confined quarters of a submarine, it certainly should be operable in the wide open spaces of a conventional power plant.

A parallel development under the direction of the General Electric Co. is the submarine intermediate reactor now being designed and developed and scheduled for construction at Knolls Atomic Power Laboratory, Schenectady, N. Y. This project differs from the Westinghouse project in that a liquid metal, rather than water, is being used as the coolant.

Active work is also now going forward on several approaches to the development and design of a reactor for aircraft.

So far we have discussed heterogeneous reactors. Fabricating fuel elements, moderator elements, and coolant tubes for such a unit is an expensive procedure. Now it has long been known that most of this fabrication could be eliminated, if what is known as the homogeneous type of reactor could be made to operate. Such a device would consist principally of a soup or slurry or solution in which the fuel compounds, the moderator material, and the coolant material are mixed in liquid form. As the fission process develops, this solution would become hot and tend to boil away were it not for the fact that it can be continuously circulated through an external heat exchanger so that excess heat might be removed. A low power model of such a reactor is now nearing completion at Oak Ridge National Laboratory. We are awaiting the results of its operation with very great interest.

There are, of course, many problems that are being attacked by the USAEC and its contractors as we attempt to move this program foreward. Much time and effort are going into the development of materials to withstand extremely high temperatures. Problems of corrosion and leakage at these temperatures are of particular importance in the homogeneous reactor design. And we must reach substantially higher operating temperatures if the conversion efficiency from heat to electricity is going to be even reasonably satisfactory.

In conclusion let me state that the USAEC has said that, within the next five to ten years, economically feasible reactor power generating stations may be demonstrated in particular sections of the United States.

RAW MATERIALS...radioactive minerals for nuclear work...

UNITED STATES- An examination of the Virgin Valley district, Humboldt County, in northwestern Nevada, where uranium minerals were found, has disclosed negligible uranium values. The U. S. Geological Survey found that in this area, which produces some of the best gem opal in the United States, "the uranium content of the known deposits of uraniferous opal is insufficient to warrant economic development at present prices". It further found that "the possibilities of finding economically minable material by additional exploration of known uraniferous layers are not considered good". The full report may be obtained from the Geological Survey, Washington 25, D.C., by requesting Circular 142, entitled "Virgin Valley Opal District, Humboldt County, Nevada".

Activity continues at a new high level in the monazite dredging and processing field. Monazite, from which the fissionable material thorium is extracted, yields other rare earths which of course contribute to its value. At Warren Valley, about 80 miles north of Boise, Idaho, Baumhoff-Marshall, Warren Dredging Co., and Idaho-Canadian Dredging Co. now are operating dredges. The sands are then sent to a separating plant at Boise. A rare earth operation also is beginning in California. Near Ivanpah, about 280 miles east of Los Angeles, Molybdenum Corp. of America has spent $300,000 for what was known as the Sulphide Queen mine. The tailings here will also be exploited for their rare earth values.

CANADA- Athona Mines (1937) Ltd. expects to start a Geiger prospecting program along the shoreline in the northwest corner of its Raggs Lake property as soon as the snow goes, President J. J. Byrne recently told the annual meeting. This nine-claim group ties onto the east end of Eldorado Mining & Refining's holdings in the Beaverlodge Lake area, northern Saskatchewan. Work to date has been insufficient to outline any zones, but radioactivity has been noted on the group.....Ridley Mines Holding Co. is preparing to launch a full-scale exploration program on its 24-claim uranium property in the Northwest Territories, located at Stark Lake, which joins the east arm of Great Slave Lake. Limited work was carried out on the property during 1950 which disclosed the presence of seven separate vein systems.....Drilling is expected to start soon on the 33-claim Fish Lake group of Baska Uranium Mines, according to an official of the company. The claims adjoin to the east those of Radiore Uranium Mines, in the Beaverlodge Lake area, N. Saskatchewan.

ISRAEL- Reports of the finding of uranium minerals here have now resulted in active prospecting. The possibility of deposits of uranium and other radioactive substances near Millenia, south of the Sea of Galilee, has been suggested for some time, and expeditions of scientists from the Weizmann Institute and a Haifa institution have recently been sent there as well as to the Jordan Valley.

SOVIET UNION- The Soviet Union is obtaining large quantities of good quality uranium ore from German areas, a recently escaped high Soviet official connected with these mines has now revealed. The official has written a report on these mines, that has just been issued by the Research Program on the U. S. S. R., a subsidiary of the Ford Foundation's East European Fund. From his observations while a chief engineer in these mines, the official reports that uranium ore containing from 4 to 17% uranium oxide is now being mined in large quantities in the German province of Saxony, from which it is shipped by rail to the Soviet Union. The mines are in the neighborhood of Zwickau, near the Czechoslovak border.

NEW BOOKS & OTHER PUBLICATIONS...in the nuclear field...

Practical Radiography For Industry, by H. R. Clauser, managing editor, Materials & Methods. A how-to-do-it book with detailed data on set-up procedures; exposure factors, techniques; interpretation; etc. Useful for those engaged in nondestructive testing work. 315 pages.--Reinhold Publishing Corp., New York 18, N. Y.

List of USAEC Research Reports for Sale; No. 20. This latest list, covering reports now made available, includes some 10 in Biology and medicine; 50 in chemistry; 28 on instruments; & 41 in physics.--Office of Technical Services, Washington 25, D. C.

ATOMIC PATENT DIGEST...latest U. S. applications and grants...

The following U.S. patents, developed in the course of nuclear research, under USAEC-sponsorship, are now available for licensing on a royalty-free basis (non-exclusive). Inquiries concerning this new group, as well as those previously made so available, should be sent to Patent Branch, USAEC, Washington 25, D.C. This group comprises: (1) Method of making neptunium trichloride from neptunium dioxide. U. S. Pat. No. 2,578,416 issued Dec. 11, 1951. (2) Mounting arrangement for a reflector for use in a spectrometer. U. S. Pat. No. 2,579,225. (3) Apparatus for the centrifugal casting of metals in vacuo. U. S. Pat. No. 2,586,027. (4) Method of preparing a solid high molecular weight polymer of trifluorochloroethylene. U. S. Pat. No. 2,586,550. (5) Easily manufactured conveniently operated apparatus to provide a non-fractionating capillary leak. U. S. Pat. No. 2,587,984. (6) Pulse forming network. U. S. Pat. No. 2,587,426. (7) Electrical instrument designed to simulate the time dependent response characteristic of a neutronic reactor. U. S. Pat. No. 2,587,919. (8) Method of recovering the valuable components of a solid sludge which contains potassium, nickel, iron and fluorine values. U. S. Pat. No. 2,588,041. (9) Process for making the hydride of a heavy metal, such as uranium, of high bulk compressibility. U. S. Pat. No. 2,588,153. (10) An improved homopolar generator which employs a liquid metal brush comprising an alloy of sodium and potassium. U.S. Pat. No. 2,588,466. (11) Thermoelectrically balanced meter network. U. S. Pat. No. 2,588,564. (12) Method for preparing the surface of beryllium metal so that it may be subsequently covered with a smooth, uniformly adherent metal coating. U. S. Pat. No. 2,588,734. (13) Neutron detector. U. S. Pat. No. 2,588,789. (14) Method of recovering boron from an alloy of boron and tantalum. U. S. Pat. No. 2,589,391. (15) Half-life determining method. U. S. Pat. No. 2,590,057. (16) Process for photochemical chlorination of heptane to approximately 80% chlorine. U. S. Pat. No. 2,590,426. (17) Oscillator controlled relay circuits. U. S. Pat. No. 2,590,826. (18) Proportional counter. U. S. Pat. No. 2,590,925. (19) Improved coincidence amplifier circuit. U. S. Pat. No. 2,591,247. (19) Improved gas-leak detector of the mass spectrometer type. U. S. Pat. No. 2,591,998. (20) Improved counting rate meter circuit which will deliver pulses of uniform magnitude. U. S. Pat. No. 2,592,416. (21) Distributed coincidence circuit. U. S. Pat. No. 2,593,948.

LATEST GRANTS- Apparatus for the measurement of gas flow. Comprising, in part, a massive base member having an inlet and outlet and formed of a heat conductive material, a loop-shaped conduit of low heat conductivity and low heat capacity operatively connecting the inlet and outlet and arranged to permit the gas flowing therethrough to make thermal contact with this base member near the outlet. U. S. Pat. No. 2,594,618 issued April 29, 1952; assigned to United States of America (USAEC.)

Flow meter for measuring small gas flows. Comprises, in part, a vessel containing an electrolyte, a gas-inlet capillary tube terminating below the electrolyte level, a fine wire electrode terminating in the capillary opening at the submerged end of the tube, a second electrode in contact with the electrolyte, and means for counting the number of interruptions in the circuit when a gas flows through the capillary tube. U. S. Pat. No. 2,594,668 issued April 29, 1952; assigned to United States of America (USAEC.)

APPLICATIONS- (These are abandoned applications, published by request of the inventors or assignees, and printed here for their general interest.) Method of preserving foodstuffs by irradiations resulting directly or indirectly from a chain reaction of neutron-induced fissions. Application No. 552,558 made by Lyle B. Borst, Oak Ridge, Tenn.; published April 29, 1952.

Hydrolysis of light metal halides. Obtaining quantitative yields of hydrogen halides from single or double halides of either alkali metals or alkali earth metals. Application No. 79,701, assigned to United States of America (USAEC); published April 29, 1952.

Sincerely,

The Staff,
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ATOMIC ENERGY NEWSLETTER